

WHAT IS CLAIMED IS:

1. A sensor retainer for a bicycle sprocket assembly comprising:  
an annular member for mounting and rotating coaxially with the bicycle sprocket  
5 assembly; and  
a sensor element fixed to the annular member.
2. The sensor retainer according to claim 1 further comprising a plurality of splines formed on an inner peripheral surface of the annular member.  
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3. The sensor retainer according to claim 1 wherein the annular member includes a threaded inner peripheral surface.  
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4. The sensor retainer according to claim 1 wherein the sensor element is embedded in the annular member.  
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5. The sensor retainer according to claim 1 wherein the sensor element comprises a magnet.  
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6. The sensor retainer according to claim 1 further comprising a plurality of the sensor elements fixed to the annular member and spaced apart from each other in a circumferential direction.  
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7. The sensor retainer according to claim 6 wherein each of the plurality of sensor elements comprises a magnet.  
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8. A sensor assembly for a bicycle sprocket assembly comprising:  
a sensor retainer for mounting coaxially with the sprocket assembly so that the sensor retainer rotates together with the sprocket assembly;  
a first sensor element coupled for rotation with the sensor retainer; and  
a second sensor element for attachment in close proximity to the sensor retainer so that the sensor retainer rotates relative to the second sensor element.  
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9. The sensor assembly according to claim 8 wherein the first sensor element comprises a signal generating element, and wherein the second sensor element comprises a signal receiving element.

5        10. The sensor assembly according to claim 9 wherein the first sensor element comprises a magnet.

11. The sensor assembly according to claim 8 wherein the second sensor element comprises:

10        a first sensor unit for communicating with the first sensor element; and  
              a second sensor unit for communicating with the first sensor element.

12. The sensor assembly according to claim 11 wherein the first sensor unit is offset from the second sensor unit in a circumferential direction.

15        13. The sensor assembly according to claim 8 wherein the first sensor element is embedded in the sensor retainer.

20        14. The sensor assembly according to claim 8 further comprising a plurality of the first sensor elements fixed to the sensor retainer and spaced apart from each other in a circumferential direction.

15. The sensor assembly according to claim 14 wherein each of the plurality of first sensor elements comprises a magnet.

25        16. The sensor assembly according to claim 8 wherein the sensor retainer comprises an annular member.

30        17. The sensor assembly according to claim 16 wherein the annular member includes a plurality of splines on an inner peripheral surface thereof.

18. The sensor assembly according to claim 16 wherein the annular member includes

a threaded inner peripheral surface.

19. A sprocket assembly for a bicycle comprising:  
a plurality of sprockets mounted together for rotation around a common axis; and  
5 a sensor element coupled for rotation with the plurality of sprockets.
20. The sprocket assembly according to claim 19 wherein the sensor element comprises a magnet.
- 10 21. The sprocket assembly according to claim 19 further comprising a plurality of the sensor elements coupled for rotation with the plurality of sprockets.
22. The sprocket assembly according to claim 21 wherein each of the plurality of sensor elements comprises a magnet.
- 15 23. The sprocket assembly according to claim 19 further comprising an annular member coaxially mounted with the plurality of sprockets for integral rotation with the plurality of sprockets, wherein the sensor element is mounted to the annular member.
- 20 24. The sprocket assembly according to claim 23 wherein the sensor element is embedded in the annular member.
25. The sprocket assembly according to claim 23 wherein the annular member includes a plurality of splines on an inner peripheral surface thereof.
- 25 26. The sprocket assembly according to claim 23 wherein the annular member includes a threaded inner peripheral surface.
- 30 27. The sprocket assembly according to claim 19 wherein the plurality of sprockets includes a first sprocket and a second sprocket, wherein the first sprocket includes a shift facilitating structure for facilitating shifting of a chain from the second sprocket to the first sprocket, and wherein the sensor element is located at a specific rotational position relative to

the shift facilitating structure.

28. The sprocket assembly according to claim 27 wherein the shift facilitating structure includes a recess disposed on a side of the first sprocket.

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29. The sprocket assembly according to claim 27 wherein the first sprocket includes a first sprocket positioning structure on an inner peripheral surface thereof, and wherein the sensor retainer includes a retainer positioning structure on an inner peripheral surface thereof for positioning the sensor retainer at a predetermined rotational position relative to the first sprocket.

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30. A sensor assembly for a bicycle comprising:  
a plurality of sprockets mounted together for rotation around a common axis;  
a first sensor element coupled for rotation with the plurality of sprockets; and  
15 a second sensor element for attachment in close proximity to the plurality of sprockets so that the first sensor element rotates relative to the second sensor element.

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31. The sensor assembly according to claim 30 wherein the first sensor element comprises a signal generating element, and wherein the second sensor element comprises a  
20 signal receiving element.

32. The sensor assembly according to claim 31 wherein the first sensor element comprises a magnet.

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33. The sensor assembly according to claim 30 wherein the second sensor element comprises:  
a first sensor unit for communicating with the first sensor element; and  
a second sensor unit for communicating with the first sensor element.

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34. The sensor assembly according to claim 33 wherein the first sensor unit is offset from the second sensor unit in a circumferential direction.

35. The sensor assembly according to claim 30 further comprising:  
a sensor retainer for mounting coaxially with the sprocket assembly so that the sensor  
retainer rotates together with the sprocket assembly; and  
wherein the first sensor element is coupled for rotation with the sensor retainer.

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36. The sensor assembly according to claim 35 wherein the sensor retainer comprises  
an annular member.

37. The sensor assembly according to claim 36 wherein the first sensor element is  
10 embedded in the annular member.

38. The sensor assembly according to claim 36 wherein the annular member includes  
a plurality of splines on an inner peripheral surface thereof.

15 39. The sensor assembly according to claim 36 wherein the annular member includes  
a threaded inner peripheral surface.

20 40. The sensor assembly according to claim 35 further comprising a plurality of the  
first sensor elements fixed to the sensor retainer and spaced apart from each other in a  
circumferential direction.

41. The sensor assembly according to claim 40 wherein each of the plurality of first  
sensor elements comprises a magnet.

25 42. The sensor assembly according to claim 40 wherein the second sensor element  
comprises:

a first sensor unit for communicating with the first sensor element; and  
a second sensor unit for communicating with the first sensor element.

30 43. The sensor assembly according to claim 42 wherein the first sensor unit is offset  
from the second sensor unit in a circumferential direction.

44. The sensor assembly according to claim 43 wherein each of the plurality of first sensor elements comprises a magnet.

45. The sensor assembly according to claim 35 wherein the plurality of sprockets 5 includes a first sprocket and a second sprocket, wherein the first sprocket includes a shift facilitating structure for facilitating shifting of a chain from the second sprocket to the first sprocket, and wherein the sensor element is located at a specified rotational position relative to the shift facilitating structure.

10 46. The sensor assembly according to claim 45 wherein the shift facilitating structure includes a recess disposed on a side of the first sprocket.

47. The sensor assembly according to claim 45 wherein the first sprocket includes a first sprocket positioning structure on an inner peripheral surface thereof, and wherein the 15 sensor retainer includes a retainer positioning structure on an inner peripheral surface thereof for positioning the sensor retainer at a predetermined rotational position relative to the first sprocket.

48. A sensor retainer for a bicycle transmission comprising:  
20 a fixing member for mounting the transmission to a bicycle frame; and  
a sensor element mounted to the fixing member.